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Economics of Electronic Information Provision

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Abstract

The paper covers the economics of preparing and providing published information. The role of the different players in the publishing chain are examined including authors and their institutions, publishers, reviewers, editors, distributors and users (readers). The costs of acquiring manuscripts, peer review, editing text, and presenting it in an acceptable format will be outlined. The economics of marketing as an aspect of availability will be explored. Different markets will need to be identified and their differing economic relationships to the publisher and the user will be described. These will include libraries, institutions, individuals and groups such as clusters of learners. The role of so-called "grey" literature is emphasized throughout as an alternative model for making available scientific information in a non-commercial environment. Economic models for providing access will be analyzed including consortia agreements, different publisher models. Examples will be used from Emerald Press, Elsevier Science Publishing, JSTOR and others. The important work of the International Coalition of Library Consortia (ICOLC) will be emphasized as a useful model for others to follow. The many different contexts in which information has to be delivered will be studied against the models currently available. This will include distance learning, the client-server relationship and the problems of access to information in Third World Countries. The changing role of document delivery will be used to contextualize the issues of pay-per-view or pay-per-use and the whole complex issue of who pays will be put forward as a final challenge to participants.

1. Introduction to publishing models

Before exploring the specific issues surrounding electronic publishing it is crucial to examine the traditional patterns that have existed for some time in the paper publishing world as many of these practices have been carried over into the electronic context and newer models are emerging from these well-established patterns. There are basically three models – totally commercial; commercial but assisted by other factors, and "grey literature". The first two have much in common and will be treated together but grey literature is a different creature and needs to be mentioned repeatedly as the exception to the general rule.

Additionally it is valuable to be able to compare and contrast the past (and the present) with the present and the future as we are in a major time of transition. This is equally true for the impact of electronic media on publishing as it is on political changes on market economies and publishing and distribution mechanisms. In many areas the publishing industry has not caught up with technology. As John Harvey Jones, the former Chief Executive of the chemical firm ICI said:

It is remarkable how little the publishing industry has changed, and how slow it has been to deal with the problems that have arisen for it over the years. The falling demand for books spells trouble, yet the number of titles published keeps going up. This is obviously in part due to falling production costs for books (Harvey-Jones 2002).

This is less true for the scientific journal publisher but, even then, some parallels can be drawn.

1.1. The model for scholarly publishing

The word "scholarly" in this context does not relate to purely academic research as carried out in many universities or institutes of theoretical research. Rather it is used in the context of scientific and technical literature in its broadest interpretation. The models are different from those for leisure and recreational publishing. For scientific monographs the traditional model has been that primarily commercial publishers will adopt one or two definite strategies. Either they will establish themselves as the major publisher in a subject-related discipline or they will concentrate their marketing on a specific segment of the market such as a particular scientific community, geographical or linguistic area or economic group. An alternative model is that the publication is produced with a subvention of either the sponsoring institution or an independent trust or similar body with an interest in carrying forward the provision of information and research in the discipline concerned. This is particularly true of the university presses found in a considerable number of academic institutions which may be mirrored by similar presses in the various publishing programmes of the Academies of Science found in many countries. In these cases the primary concern is the publication of the information rather than the commercial viability of such a publication in its own right. A combination of these models can be found in presses which have both a non-commercially viable list and a highly "popular" one. Such an example is Oxford University Press in the UK which publishes very scholarly monographs with a very limited market (and no hope of commercial viability) and also a wide range of popular titles ranging from dictionaries and atlases to children's books and school textbooks. With a certain amount of cross-subsidy and support from the university itself OUP can manage to produce high-quality scholarly works in disciplines ranging from archaeology to zoology. This model is now re-emerging for journals as individuals and institutions are being asked to contribute to the cost of publishing their research.

1.2. Grey literature

However, it must not be assumed that the commercial or scholarly model is the only one already in existence and vast amounts of scientific data are readily made available through non-commercial outlets. This is usually given the generic name "grey literature". People have often asked for a definition of grey literature and those who are used to handling it usually say "Hard to say but you know it when you see it." Essentially this term is used to describe that output of the scientific community which is carried out purely for the benefit of the community itself. It is not done for commercial gain and often costs the "publisher" quite a lot in printing and distribution terms. Material is often produced direct from camera-ready copy or even photocopied from an original. Increasingly it is stored on a PC and printed out or sent as an email attachment as required. It rarely enters to commercial marketing chain and is not available through normal bookselling or subscription agency outlets. It may not be controlled bibliographically through the normal channels although the efforts of EAGLE (the European Association for Grey Literature) in constructing a European-wide database has done something to correct this particular weakness. Grey literature may be in paper form or often in microform such as the huge output managed by NASA and ERIC in the USA or many nuclear and environmental agencies in Europe. The different model used here for publishing is exemplified by the fact that many of those who produce this material are happy for it to be photocopied for further use without any permission being sought or royalty paid in lieu of purchase. Grey literature falls outside the remit of most copyright licensing agencies and the licences they offer.

2. The processes in the publishing chain

2.1. The role of the author

It is a truism that publishers cannot publish unless someone creates something for them to publish! Therefore the process must begin with an individual or a group of individuals preparing a piece of work which they wish to have published. The group may be a team of scientists or simply the management of an institution.

The motives for scientific and technical publishing are most often that the researcher wishes to make known the findings of the research carried out and also to enhance their national or international reputation in their field of expertise. This is particularly important in an increasing number of academic environments where awards from university authorities or central government to individual departments is dependent on the number of academic papers published by the staff of that department. This will be discussed further under "peer review". It is certainly true that a small minority of authors actually publish to make money. These are

mostly authors of standard textbooks used by predominantly undergraduate students so that sales are often in bulk and guaranteed on a recurring cycle as they are recommended reading on university courses. In the case of grey literature concepts of enhancement of reputation and certainly commercial gain are entirely lacking.

2.2. Editors

Most publishers are well-versed in their own discipline – publishing. They rarely know *for themselves* what material is the most appropriate to publish or, indeed, even how to find it and certainly not how to evaluate it. Therefore publishers use specialists in the field of expertise to edit journals or series of monographs to ensure that the highest quality material is published under their imprint. Editors are usually drawn from the scientific community and have considerable knowledge of the latest developments in their field. They can evaluate a paper or text for a monograph from a technical as well as literary viewpoint and decide whether or not it is suitable for publication from the point of view of originality, content and relevance. As no editor can have a total overview of a subject most editors turn to a team of reviewers in the discipline concerned for advice and comment on papers submitted for publication. This is usually called “peer review”. This process is, of course, entirely absent in grey literature as the decisions about “publishing” will relate only to whether or not the issuing institution wishes to disseminate the information or not.

Once material has been received and it is agreed it is appropriate for publication the editor must then decide how and when to publish it. Decisions about format, timing and context will all need careful consideration.

Having reached the point of deciding what to publish and when, the production process proper begins. Texts need to be prepared in a standard format and edited for linguistic correctness (something of a debating point in many scientific communities), form of references and bibliographical notes, accuracy of content and suitability of the format of diagrams, drawings and illustrations.

Once these points have been settled and the text is ready from a professional scientific point of view it must then be submitted to the publisher for printing. The way in which this is done will vary from one publisher to another. Again, grey literature avoids most of these bureaucratic structures but at the cost of usually having a rather boring appearance.

2.3. Publishing and distribution

Once the editor has performed all the necessary tasks of deciding where and how a work will be published the publisher will then take over the technical processes of printing, binding and packaging for distribution to the public. Monographs and journals require very different distribution strategies as is fairly obvious.

How then are these different links in the publishing chain achieved in the traditional publishing model?

3. The traditional models – the role of the author

3.1. The origins of manuscripts and texts

Different segments of the publishing industry deal with different models of creativity. In the case of the recreational market (novels, leisure magazines, for example) publishers will often commission works on a speculative basis that they will sell. First time authors will probably submit manuscripts proactively but, once established, publishers will contract with them to produce more novels. In the case of leisure magazines publishers rely almost entirely on identifying subjects they wish to cover and then commissioning a well-known author to write that subject up in a suitable format. In both cases the author will be paid although mechanisms for this will vary. This segment of the publishing industry is not one that will be discussed further in this chapter.

There are usually two complementary methods for editors to obtain papers for their journals or monographs for their series. Particularly in the former case authors may submit a paper for consideration proactively in the hope the editor will accept it and publish it. Alternatively the editor may identify a particular piece of research or a specific author who would enhance the reputation for the journal or publisher if included in the

publications programme. In this case the editor will approach the persons concerned direct to try to persuade them to write an article or prepare a manuscript.

Authors come from many different backgrounds but essentially there are three major areas on which editors and publishers can draw. The academic world in terms of universities, higher education colleges and individual researchers (the honoured but much-neglected amateur) will provide a vast array of papers for almost any journal. The commercial and industrial sector of research will also be a rich ground to harvest.

These different sectors may have competing or conflicting reasons for wishing to have their papers published. Increasingly the boundaries between different types of organization are becoming blurred and it is sometimes impossible for an individual researcher to be sure whether they are working for a commercial company, a government agency or a university at any given moment.

These diverse motives and pressures lead to a series of problems for editors of academic journals but less so for those planning major monographs. The latter have a largely archival and teaching role in modern scientific and technical areas so pressures are more about kudos and possibly financial reward than those outlined below.

From an economic point of view it is rare (though not unknown) for scientific authors to be paid at all for publishing their papers in academic or scholarly journals. They may be paid royalties for monographs and these can either be a one-off payment or a percentage of the retail price for every volume sold. Putting aside the monograph element, this means that the publishing industry receives the raw data for its publishing programmes free of charge (although not free of cost). The costs for publishers are essentially in the processing of the articles themselves rather than in paying fairly small royalties to authors.

As can be seen the grey literature model is different here. There are no costs of peer review associated with authors or editors as material is often produced "in-house" within the research budget costs of the institution concerned.

3.2. Academic authors

As academic institutions move from being funded entirely by the state (with contributions from students as appropriate) to having to fund many of their activities from other sources there is increasing need to build partnerships with commercial and industrial concerns to carry out for them on an agency or partnership basis, some of the research which the company may wish to do but which it is more cost-effective to have done in a collaborative environment. On the other hand the issue of "publish or perish" is an important one for academics. Publish or perish essentially means that either a department (or individual author) must either seek publication of relevant papers in appropriate journals or else lose their status and funding. As mentioned above many departments now rely on their staff achieving publication in recognized journals or by well-established publishers in order to obtain funding for the department from either the central university or from national government.

Clearly editors will find themselves under considerable pressure from individual scholars and universities to publish papers by and from them to help bolster their reputation within the scientific world and also ensure adequate funding from public sources in the future. There may also be a further agenda that a particular researcher or university is anxious to secure a particular contract with an industrial partner and publication might be part of the strategy to obtain that contract.

Grey literature meets none of these criteria and so is not considered by academics generally as an available outlet for other than ephemeral research reports.

Generally speaking, academics are less interested in payment for publication than the other motives outlined above. However this is set to change in the electronic environment as will be explored later.

3.3. Industry and commerce

Companies may wish to publish research data to promote their products and activities. There is also the incentive on some jurisdictions to provide evidence for a patent registration. Alternatively such companies

may be reluctant to allow publication for reason of commercial confidentiality. These vested interests from commercial companies will necessarily transfer themselves to plans to ensure (or prevent) publication by an editor in either a particular journal or, indeed, any journal at all.

Most industrial companies have little interest in receiving payment for publication by members of their staff. The sums of money involved would be small in comparison with the total research budget and their motives lie elsewhere than in raising revenue. For this reason a considerable amount of grey literature emanates from industrial companies. It is cheap to produce and entirely within their control as to who obtains copies of it. Large stocks are not needed and the company, which is usually not geared up to meeting demands from the general public for its output, can concentrate on its real business whilst meeting any proven demand without undue costs.

3.4. Government funded organizations

The third possible major source of papers is the public sector where scientific and technical research is funded by government (local, regional or national) and there will be a desire to make findings assessable "for the public good". At the same time this same very public good may be the reason why some research data is once again withheld from publication. It may be sensitive in terms of defence or might be considered a potential source of public alarm by politicians who may find it more appropriate to keep the information for internal and restricted use only. Editors may find either that they are under pressure from government to become a further tool in their political plans or else that they are met with a stonewall when trying to obtain papers on a particular subject for inclusion in their journal.

Government is probably the greatest source of grey literature in the world. Government agencies have variable policies regarding the sale or acquisition of their publishing output, ranging from the almost unlimited access approach of the US government by virtue of the clause in the 1976 Copyright Act which prevents them from enforcing copyright in their publications (and therefore any subsequent use or republication of them) to the UK Government which, until very recently, took a highly protective approach. Fortunately, in the latter case, this approach has now been relaxed and Her Majesty's Stationery Office (HMSO), as manager of copyright owned by the British crown, requires government departments to be much more open with their material including allowing it to be freely downloaded and copied. Further details of the UK government's open access policy can be found on their website at www.hmso.gov.uk

Again, authors and institutions in this sector are less interested in payment than promoting their activities. Although increasingly the public sector in most countries is under pressure to earn revenue, this has not demonstrated itself as a major obstacle to getting material published in the past.

4. The traditional models – peer review

The peer review system is at the heart of academic publishing and is one of the most controversial elements in the electronic age. Essentially the system is a filtering mechanism to help editors and publishers to determine what should and should not be published. As mentioned above, editors will assemble team of experts in the field in which their journal is published and refer papers to them to consider if they are (a) suitable for publication as they stand or (b) essentially suitable but requiring further work or (c) unsuitable for publication in the journal concerned (or, perhaps, in any journal at all). The process is often carried out on a "double-blind" basis so that the author has no idea who the reviewer is and the reviewer is not given any information as to the identity of the author. Only the editor holds both parts of this information. This is intended to ensure that any personal prejudices or antipathy to a particular institution are removed from the vetting process and that papers are considered solely on their scientific and research merit. The editor is therefore put in a particularly delicate position when the different pressures on him or her are considered. The system may be used to ensure an impartial decision or it could be used as a shield behind which highly subjective judgments could be made.

The economics of peer review are often overlooked by those writing for or reading academic journals and texts. It is a very time-consuming and labour-intensive activity involving many hours of decision-making by editors and considerable administration to ensure it is carried out effectively. Papers are received by editors

and usually acknowledged to make sure the author knows it has arrived and is being processed properly. Occasionally an editor will return a paper immediately as being unsuitable for the journal because of the subject matter. Journals whose content is devoted to management rarely want articles whose topic is ornithology (unless it is a paper on managing a bird garden in a zoo!). The editor will then identify a suitable reviewer and pass the paper on, keeping records of when and to whom the paper was sent. The reviewer must then find time to consider the paper and perhaps undertake some research to identify whether or not it is both accurate and current as to its information content. The paper is then returned to the editor who will then either decide to accept the reviewer's comments or possibly contact a second reviewer for a further opinion. Many editors actually pass papers to two or more reviewers immediately so as to obtain a balanced opinion. All this takes time which can slow down publication and which causes considerable irritation to many authors as they are seeking speedy exposure of their research to the scientific community. However, the costs of this are often borne by the very same group of institutions from which the authors themselves come. Reviewers are not paid for their time and effort and often squeeze in such activities between teaching or other research activities. Editors themselves rarely receive more than fairly nominal payment for their efforts.

Peer review is, of course, entirely absent from grey literature as the aims and objectives of the process are quite different. The decision as to whether to make a particular document available will rest more with a senior researcher, often personally involved in the actual research being described, or with a senior civil servant or politician in the case of government material.

5. The traditional models – the role of the editor

Texts may well pass backwards and forwards several times for revision and correction between editors and authors before a final version is agreed. Even when this is done using conventional electronic technology such as floppy disk or email it is still a costly and expensive process for both authors and editors. Editors will still be responsible for the overall layout as well as accuracy of the final text including the proper positioning and labelling of illustrations and correct structures for headings, sub-headings and footnotes. Whereas publishers used to accept text in a fairly "raw" state now they are unwilling to take "raw" text produced on a conventional typewriter (and even less in handwritten format) and material must be submitted in electronic format on disk or email with strict guidelines on format, layout and even coding.

Editors must submit text in a ready-to-print state and publishers no longer use sub-editors to carry out the finer points of house-style and bibliographic citation. This is increasingly becoming part of the editorial process. Such publishers as Emerald Press (formerly MCB University Press) transferred much of this work to the editor some time ago, requiring them to deliver text that was virtually ready for printing. Publishers increasingly take the view that their investment is in the packaging, marketing and distributing of products rather than their preparation. This, it is argued, is simply an extension of the trend towards camera-ready publishing which has been a feature of scientific publishing, especially for conference papers, for many years. It is worth noting that much of the camera-ready publishing was not carried out for strictly commercial purposes but rather as part of a larger research package to make material more widely available. Here quality of end-product was less important than the combination of speed and cheapness which this technique afforded. To move to something similar for strictly commercial publishing has caused some considerable debate in the academic community.

Once again, editing text is something which is usually done to grey literature with a light hand. Only essential corrections will be made and often there is no "house style" other than that reflected in general internal protocols which will be used to prepare the document in the first instance.

6. The traditional models – the role of the publisher

Once material has been accepted, edited and prepared it must be published. This is a self-evident statement but one which needs careful consideration as the term "published" has many meanings and nuances. One useful definition which is used by UNESCO and other bodies is "issuing copies of the work to the public at a time when copies made in advance of receipt of orders are generally available to the public". In other words, a publisher produces printed copies which are usually put in a warehouse and are therefore available to meet any

orders as and when they come in. This clearly excludes any form of on-demand publishing such as holding a work on microfilm or a PC and printing off copies as and when the need arises or sending them by email as an attachment. However, to stay with this definition, it is clearly the primary activity of most commercial publishers and also of those who are working in a quasi-commercial market such as university publishers.

This is one of the most expensive elements of traditional publishing. Even by using modern printing methods a whole series of highly complex and skilled actions are now needed. Printing, collating and binding works is a high tech activity which may involve operators in two or three different countries or even continents. Material has to be shipped around from place to place in different formats and finally stored and dispatched to many different points often throughout the world. These points may be direct orders, booksellers, subscription agents or individual subscribers. The maintenance of subscription lists or delivery addresses as well as the whole complex area of billing, accounting and following up customers for payment is a huge charge on any publisher or supplier. This then links into the associated costs for the running of bookshops and subscription agents.

Essentially this is a model by which the publisher sells access to the information by producing multiple copies of the carrier of that information (usually a scientific journal or perhaps a monograph) which the customer then purchases and over which that customer has total control in terms of the physical documents. Naturally the intellectual property rights (usually copyright) are retained by other players in the information chain (discussed in more detail in another chapter) but the purchaser has the absolute right to do whatever they wish with the physical volume bought. This provides the purchaser with current access and an archival resource. Access is limited to one person per item by the physical nature of the material but unlimited access is possible in a sequential situation.

Once again, grey literature is outside this model. Few copies of reports in this category are produced and there is no concept of a market in advance of publication, if publication can be used in this context. There is virtually no warehousing problem and if there is real demand for a particular document then a visit to the company or departmental print room will usually ensure that enough copies can be made to keep everyone who needs one happy.

7. The traditional models – marketing material

It is clear that any publishing exercise requires marketing of one kind or another in order to achieve the required impact. For commercial publishers this is a vital element in any business plan. Failure to tell prospective customers what is available under what conditions and from where it can be acquired would negate the whole exercise. Therefore publishers expend considerable amounts of money, time and expertise in promoting their products. For those who have focused on a particular segment of the market as described earlier the challenge is less daunting as for those who have carved out a niche in a particular discipline but for those trying to expand their markets or penetrate new areas this can require a considerable outlay of capital. This may be true simply because particular monograph or new journal title crosses one or more disciplinary boundary and is a multi-faceted publication which should appeal to readers in a variety of areas. In addition publishers need to keep their products constantly before the potential market place. Monographs need to be advertised but also the subject of in-depth reviews in relevant journals. New and even established journal titles require review but also frequent citation in abstracting and indexing services and other bibliographical tools. It is for this reason that many publishers are happy to have their contents pages photocopied or digitized and used as current awareness bulletins by libraries and information providers. Although this may possibly stimulate photocopying for which the publisher may receive no direct compensation nevertheless the fact that the journal is repeatedly consulted and cited means that its value to the academic and research community is going to be considered high and therefore the journal subscription will not only continue but may become a multiple one. Given that cuts in library budgets are frequent and a global phenomenon it is essential that publishers can demonstrate the value of their products over against other titles, even if they are not in direct competition from the point of view of the subjects covered.

In the case of scientific and technical material the existence of the peer-reviewed journal is an essential element of marketing. The journal provides a ready-made package in which the consumer buys a range of pre-packaged products including technical articles, editorial comment, correspondence, advertisements and

information about current and forthcoming events such as conferences and new projects. The journal has a reputation and the purchaser knows what is being offered in terms of quality of academic content, presentation, relevance and scientific integrity. The marketing of the learned journal is an essential element in the economics of scholarly publishing as it provides a ready-made "label" recognized by the reader and the purchaser (the library or the institution) as well as by the author. It is this labelling that is essential for marketing but also for the status of the author. Publication in an esteemed journal ensures that status is either retained or enhanced in the scientific research community.

There is an additional facet to marketing which is often overlooked in the determined effort to adopt an economic interpretation of this term. As well as selling a product and generating revenue, marketing is also about making a product known because that is the essential role of any publisher. Publishing is essentially making things available to the public whether for profit or not. Therefore every publisher has a role in disseminating information of various kinds. So whether or not sales are generated it is important that the product, and the information contained in the product, are widely known. This is equally true of the total commercial publisher and those whose commercialization is underpinned by other elements such as outside trusts or university funding. In fact many of the latter would put dissemination of information as a top priority beyond mere revenue generation. In the UK members of the Association of Learned and Professional Society Publishers (ALPSP) repeatedly make this point when discussing issues such as copyright, ownership of rights in journal articles and payment for authors. See their website at www.alpssp.org.uk and the journal *Learned Publishing*.

Once again grey literature makes little effort to market itself in the traditionally-received understanding of that term. However, like other publishers the producers of grey literature do want their work to be read and disseminated. However there will be a disinclination to promote the publication too vigorously in case demand is stimulated beyond what the producing organization can reasonably meet. Therefore "marketing" of grey literature will be more focused on making the document known to those who need to know about it rather than reaching out to those on the fringe or the merely curious. The use of bulletins and abstracting and indexing services will be more prominent here although some government departments may use the propaganda machinery of government and politics to make certain documents widely known and their availability easily understood. These factors will be influenced as much by politics as by economic aspects of information provision.

8. Libraries and access

In the past access has been via the published journal or, less important in volume terms but crucial in such disciplines as high-energy physics, the distribution of preprints. Rarely do individual scientists subscribe to journals because of their high cost; occasionally a researcher may build subscription to a journal into a project proposal but essentially access has been, and in many cases still is, via the library. The library is the knowledge storehouse of any institution and its very nature places it in a pivotal position for the dissemination of knowledge.

Traditionally librarians have collected and conserved material and, more recently, worked to make it more accessible and publicize what they have. However changing patterns of information provision could mean that users go direct to sources of supply without consulting the library at all. In theory this could mean the end of libraries in as we understand them today. It is most unlikely that this will happen because (a) libraries are themselves major sources of information provision and (b) users cannot have access to every source of supply and need guidance on what is the best and most appropriate source for their needs. As has happened in the case of databases there will always be a need for an intermediary although the role for that intermediary will change but not disappear. Nevertheless the role of the library will change from supplying information and documents and leaving the user to decide what is relevant or most interesting, to supplying packages of information, much of which has already been evaluated to reduce, if not eliminate, the "noise" factor. The desire, never mind the need, for information is a constant feature of current cultural patterns, particularly in the industrialized world. The information may be supplied in various ways: newspapers, journals and books, broadcasts, television, teletext, sound, video, images or online systems. These are all materials and carriers which are commonly found in libraries and handled by librarians. In the more sophisticated reaches of the information supply industry librarians are not simply renamed "information scientists" but transmogrified into "knowledge scientists". A knowledge

scientist is not expected to provide information but to interpret it for the customer. This particular trend leads those in this situation to receive requests for appropriate data, suitably packaged, on a given topic or aspect of a topic. The resulting package may be a concoction of statistics, manipulated data, law, company information, economic projections and predictions and some documents. The knowledge scientist will be required to obtain such information, whether in the form of documents or other carriers, either locally or from remote sources. The customer in this situation has little interest in where or how the document was procured so long as it supplies the needs of the time. Although this is at one extreme end of the information supply spectrum, it is nevertheless symptomatic of an increasing trend in the information industry at all levels. Documents are seen as vehicles for information in its widest sense. And "information" should not be understood in too narrow a sense. The content of a well-established piece of non-factual writing is viewed by many as a piece of information and the format in which it is delivered is far less relevant than the delivery itself. The growth in the use of audiocassettes by car drivers, by users of public transport or even those taking physical recreation to replace reading habits is a clear sign of this attitude.

8.1. Libraries are not supermarkets

Many people have argued that the Library is a sort of information supermarket but this view is quite inadequate. Certainly supermarkets do collect a wide range of products, often competing with one another and therefore allow the customer to choose the products they require. It may also expose the customer to products and services of which the customer was previously unaware and had never thought of purchasing. Although the supermarket collects together a wide range of products the scope of this is dictated entirely by commercial requirements. Although some items will be offered for sale which are unlikely to generate much, or any, profit these are seen in an overall context of drawing customers in to buy other products which generate considerable income. The practice of deliberately offering one or two products at vastly reduced costs is a clear example of this. Nevertheless, overall, the purchasing policy of the supermarket will be dictated by commercial needs. In the same way there will be certain groups of customers which the supermarket will wish to discourage. For example, households consisting of single persons or elderly persons on reduced incomes may not be welcome in some shops. Their product requirements are often small and limited and unlikely to contribute to the overall income generation policy of the store. At the other end of the spectrum there will be high quality, high price products which would probably move very slowly from a supermarket environment and these would be excluded and therefore certain groups of customers who expect to find this sort of product readily available.

A library, on the other hand, will make strenuous efforts to collect all such materials it considers likely to be required by its users now or in the foreseeable future. There will be no consideration of commercial benefit but only the likelihood of meeting the requirements of the user community. Naturally acquisition is limited by budgetary considerations and judgments will have to be made about which services or information products to acquire. This will be governed by use and usefulness rather than income generation. At the same time no library deliberately excludes any sector of a community which is entitled to use it. Public libraries make strenuous efforts to attract users from all sectors of the community regardless of economic, social, political or chronological status. Similarly academic libraries try to serve all aspects of the community in their remit as do those in commerce and industry. A concept of deliberate exclusion would be alien to the provision of library and information services generally. Therefore the supermarket model for a library and information service is not valid and, in fact, quite misleading.

The nature of information is also against the adoption of the supermarket model. Although serendipity plays an important part in shopping activities, most people have a fairly good idea of what it is they want to buy or achieve by visiting the supermarket. By its very nature information does not fit into this model. This is because information is actually imparting something to a user which they did not have before and which they did not know and therefore the analogy with shopping is again misleading. Apart from a few basic factual pieces of information most users of library and information services actually use the service to move them on into new avenues of thought or ideas which they have not previously considered.

Considerable time has been spent on the role of the library because it is the primary customer for traditional printed materials. Any changes in the access and availability patterns for information will have a profound effect on the library service and, conversely, any changes in the library services will profoundly affect access and availability.

9. Provision in the electronic world

Some time has been spent deliberately on the "normal" publishing models because, until they are fully appreciated it is not easy to understand why and if the electronic world is different. Also it is important to be able to compare the two environments to see if the models can be crossed over from one to the other in any way. Having established in some detail how the current scientific publishing world works in a commercially-driven context we now need to see how these elements are changing in an electronic world. We shall examine each element in the chain to see what relevance it has in the "new" electronic environment.

The role of author, editor, reviewer, publisher, distributor, purchaser and reader are all undergoing major changes, many of which are still in flux and will almost certainly change over quite short periods of time.

Many different models are emerging including the Budapest Open Access Initiative, Open Archives Initiatives and many related models including Open Knowledge Network and Creative Commons. This is a very fast-moving and dynamic area for scholarly communication and any description can be nothing more than a snapshot of the current situation. Those interested can follow some of the more high-powered (and sometimes vitriolic!) discussions on Open Archives, commercial publishing and the role of the scholarly author should refer to Stevan Harnad's discussion list. (This list is called SEPTEMBER98-FORUM@LISTSERVER.SIGMAXI.ORG and was consulted on 18 April, 2002). For example, David Goodman of Princeton University recently wrote:

Should a rational publisher fear the OAI?

A rational publisher need not and does not fear the OAI for those journals which are worth reading, and consequently worth buying; it will both now and in the future be able to sell these. It certainly ought to fear for those journals that are not worth reading, and consequently not worth buying. The only function of these journals is to certify publications as having been at least superficially "peer-reviewed." This can obviously be done at a much lower cost; thus, if they continue to publish these journals at anywhere near the present prices, they will not be able to sell them. Considering the low demand, it seems probable to me that they might not be able to reduce their costs enough to sell them at all. The solution for a publisher is obvious: it should publish good journals, and only good journals. A publisher complaining about the threat of OAI suggests that it knows very well that the quality of its journals cannot compete. (This comment can be found at SEPTEMBER98-FORUM@LISTSERVER.SIGMAXI.ORG on 1 April 2002).

However, a proper understanding of the underlying issues raised by these many different and often competing models is crucial to the proper interpretation of the varying ideas being presented. A recent attempt by UNESCO to develop an International Alliance for Information Access (IAIA), focusing particularly but not exclusively on Third-World issues shows how important it is to ensure that these different models, all well-meant and often of extraordinary value and relevance to the distribution of scientific ideas, are co-ordinated in some way to ensure maximum benefit to the communities they seek to serve. At the same time their independence and commercial roots needs to be respected and therefore the most that can probably be achieved is an attempt to provide an overall picture to inform those working in the field rather than to offer any guidance or structure within which these different initiatives can flourish.

Therefore the different roles within the publication chain are themselves in a state of considerable change and the economics of how publication takes place are also under severe strain. How then can scientific information continue to be made available in such an unstable context? Although the answer is that "nobody knows" this is not helpful! So we must try to understand the new roles in the new context as best we can and draw out the inferences for the economics of information distribution accordingly.

9.1. The author

Whatever else changes in the field of scientific information distribution, there can be no doubt that the author will remain. Without the creativity of the author there can be nothing to distribute. Authors need to make public (carefully avoiding the word "publish" as this has many possible interpretations) their findings and ideas in order to stimulate discussion and move forward scientific and technical development. However, the traditional models described earlier will no longer be viable. There are a number of interrelated reasons for

this. These are concerned with personal status, publisher economics, archiving of scientific information, academic and research institutions' attitudes and freedom of access.

To quote the Budapest Open Access Initiative (BOAI) from their website at www.soros.org/openaccess

An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the Internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds. Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.

All of which sounds very good and honourable and idealistic but, as it stands, fails to address the economics of how to make information available.

9.2. Personal status (kudos)

This is an essential part of making works available to the public. For this reason the peer-review process is still essential as this guarantees the reliability of the information provided. Publishers of traditional journals agree that it is a costly and time-consuming exercise yet essential to their publications and the integrity of the scientific community as a whole. Failure to incorporate peer-review into journals leaves the field wide open to any eccentric or the deliberate sabotage of serious scientific investigation.

In the present paper-based world the current level of minimal, toll-based access, society is paying an average of \$2000 per paper from the minority of institutions that can afford the journal in which that paper happens appear. However, peer review is essential and authors need this to authenticate their work. But peer review has to be in the context of a recognized product, in other words the scholarly journal with its status and reputation. In an electronic context the whole concept of the "journal" has to be maintained in some form in order to achieve this. Merely to put a paper on the web and say it has been reviewed by experts and accepted is insufficient in the present climate of academic approval.

Peer-review is perfectly possible online as well as in traditional methods of distribution. Indeed it is essential it should continue. As Sally Morris of the Association of Learned and Professional Society Publishers (ALPSP) has said:

People value peer review and they value research being gathered together in things called journals. Peer review will continue exactly as before there was open access. Journals will continue to be journals. What will change is what "gathered in" means. And open access is for those would-be users whose institutions cannot afford access to each given paper, either on-paper or on-line. That corresponds to the majority of potential users, for the majority of the annual 2 million papers in the 20,000 extant peer-reviewed journals. All of that would be lost research impact otherwise. (Morris 2002)

9.3. The economics of being an author

Most authors of scientific materials (excluding some textbooks) do not write for money as has already been argued. However, the cost of producing articles for scientific journals is high but not in terms of fees for authors. Authors have more interest in making information available than receiving royalties. To quote the Budapest Open Access Initiative again:

The literature that should be freely accessible online is that which scholars give to the world without expectation of payment. Primarily, this category encompasses their peer-reviewed journal articles, but it also includes any unreviewed preprints that they might wish to put online for comment or to alert colleagues to important research findings. There are many degrees and

kinds of wider and easier access to this literature. By "open access" to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

In this context authors were not worried about issues such as copyright either as copyright tends to be an economic reward for work done and no such rewards are available in this context. Or are they?

With the introduction of electronic copyright management systems (ERMS) the whole model is changing. The issues of electronic copyright are discussed in another chapter but are also relevant to the economics of making information available. Works issued in paper form could be controlled only by fairly blunt instruments such as licensing agreements which are based on sampling systems to see what is copied and by whom. In return for this the licensee (the person taking out the licence) pays a fee which the licensing agency then distributes to owners of copyright using the data collected by the sampling surveys. When material is distributed in electronic form it is quite possible to determine when an individual article is viewed, downloaded or print out. Consequently exact use statistics can be generated and payment made to the owner on a much more realistic basis. Therefore some scientific authors are now claiming that as publishers make money out of their work the authors themselves should be compensated according to the way their works are used. This was not previously possible.

One consequence of the introduction of electronic distribution is that the role of the licensing agency is weakened. The blunt instrument approach is not needed and the intermediary for collecting fees for copying and use can be eliminated as the technical capabilities of the web expand. Copyright licensing agencies are finding it more and more difficult to retain their position in this context and rely more and more on bulk licensing for educational copying or multiple photocopying in industry with some revenue coming from document delivery services.

The ERMS issue is further brought into play by changing attitudes in many institutions which employ those who write the articles. Formerly they took little interest in ownership of the rights in the material that their researchers produced but there is an increasing awareness of the value of the intellectual content of the material created by their staff. Now, however, such awareness is much more intense and institutions, both in the public educational sector and in the private research sector, are much more keen to obtain rewards for the contribution their staff make to scientific research globally. This value can be assessed and identified using ERMS as this gives a clear indication of the level of use and many researchers will work on the assumption (not necessarily correct) that volume of use = value to the community. The assertion of rights by institutions brings about yet another conflict that between the employer and the employee. To what extent an individual employee owns the rights in what they create is a serious matter of legal dispute in many countries and organizations. It is particularly crucial in the university and higher academic context where contracts are often unclear (or even silent on the issue) and where the different roles fulfilled by individual researchers are also far from clear-cut.

9.4. Creative Commons

In a boon to the arts and the software industry, Creative Commons will make available flexible, customizable intellectual property licenses that artists, writers, programmers and others can obtain free of charge to legally define what constitutes acceptable uses of their work. The new forms of licenses will provide an alternative to traditional copyrights by establishing a useful middle ground between full copyright control and the unprotected public domain.

The first set of licensing options Creative Commons plans to make available are designed mostly for people looking for some protections as they move their wares into the public domain. Those protections might include requirements that the work not be altered, employed for commercial purposes or used without proper attribution.

Lessig adds that it's possible Creative Commons' licenses may eventually evolve to include options that permit or enable certain commercial transactions. An artist might, for example, agree to give away a work as long as no one is making money on it but include a provision requiring payments on a sliding scale if it's sold. As participation in the Commons project increases, a variety of specific intellectual property license options will evolve in response to user needs, which in turn would create templates for others with similar requirements (Lessig 2002).

9.5. The publisher in the electronic context

It must be acknowledged that publishers are nervous at the present time. There is a great swell of opinion that the traditional publisher and publishing methods are doomed because of the advent of the web and instant access to individual works by individual researchers. Whilst nobody would argue with the fact that publishers publish for profit, the basis for the activities of the industry is to make the creativity of authors more widely known to the public. Indeed, away from the recreational writing market, most authors write not for profit but to make ideas more widely known. But no author or publisher can reach all potential readers of any work and needs intermediaries. Although booksellers fulfill part of this role they provide only those materials which are likely to sell and therefore their role as intermediaries is limited to commercially attractive material. The library provides the interface between the publisher and the untapped, and untappable market and therefore enables one aim of publishing - to reach the public - to be more effectively achieved. Publishers cannot hope to reach every potential outlet for their products because they do not have the direct contact with the necessary groups to achieve this. Publishers are also limited in what they can provide in terms of a repertoire which will normally be limited to their own products or those of associated companies.

The argument is that all this changes in an electronic world. Publishers can reach anyone who has the technological capability to connect to their database and online services. Publishers should view this new model with excitement as it opens up a huge potential market never before realized.

However, publishers also realize that the majority of their current products are not bought or paid for by individuals but by institutions, especially libraries. If publishers are to market their products direct to the end-user then a revolution in economic modeling needs to take place.

9.6. Pay per view and pay as you go

Electronic methods of providing access enable users to choose more directly exactly what it is they wish to view or use and not be required to scan through material that is neither relevant nor useful to them. It also enables subscribers to pay only for what they actually want rather than buy paper journals which, as predetermined packages, deliver what the publisher wishes to deliver and which often contain unwanted information of many kinds. Given that many articles are never read at all (an average readership of 0.2 per journal article was found by an ICSTI study (ICSTI 1996) some years ago) this is plainly a more satisfactory way of paying for information. However, it does mean that the actual costs of access are infinitely variable and not easy to predict, especially if publishers vary the cost of access and use within a given journal title. This is entirely possible given the sophisticated technology for controlling access now available. In the paper world, once a journal has been bought, the level of usage is important only in determining if it is value for money, otherwise limitless use is possible, albeit on a one-person-at-a-time basis. The electronic methods of publishing allow for concurrent multiple access. Moreover, access can be site-wide or even on multiple sites simultaneously provided the use is allowed and paid for. This scenario raises a number of important questions.

Firstly, payment for access. The vital question is: who is going to pay for access to electronic materials if they are to be individually accessed by researchers and even students direct. Although those in a purely commercial context will probably be able to afford access to whatever they need, because of the economics of information use in industry, others may well be disadvantaged because of the complex pricing models that copyright owners impose through the electronic world. High access charges may be one difficulty for libraries anyway but increasingly copyright owners are demanding payment before use is permitted. Whilst the library may be able to manage this to some extent by "up-front" payments, very often the use will be determined by the user on an *ad hoc* basis.

A public or academic library may provide online access free of charge to all its users but how does the library manage the situation where, for example, a user begins a search on the Internet, only to be asked for a credit card number before they can proceed to a particular database. The librarian has to face the challenge: do we continue to struggle to provide access to information which will be free of charge at the point of delivery to the user or do we have to develop alternative service models which either limit the access any user can have or require the user to pay beyond a predetermined limit. The problems of internet publishing have been explored extensively without any major conclusions being reached (Kahin and Varian 2000).

Library budgets throughout the world are not growing. How many readers of this paper would be able to say that their library budget is actually growing? Not many people would answer this question with the word "yes". Perhaps we have to look at alternative models from other parts of society. If a student in a university cannot pay their fees, there may be financial support from the local or national government, from charitable funds or from the university itself. In public libraries we may need to look at how citizens are funded to obtain satisfactory housing, free public transport, free medical care or reduced charges for using local sports or leisure facilities. In a world where smart cities are rapidly becoming a reality, it may be time for the services offered by library to be included in this scenario. After all, in some cities one smartcard will allow you to pay your local taxes, provide access to local transport (at full rate or reduced/free tariffs if the user has special social needs), give entry to the swimming baths or even pay your library charges! Perhaps access to information needs to be seen in the same context as other social services which are paid for by the local, state or national government. If you are entitled to subsidized housing, perhaps you should also be given subsidized access to information.

10. The role of the library

On the other hand, libraries are used by millions of people who never had any intention of buying their information nor have the economic power to do so.

Libraries, however, can, and do, reach a wide audience as they have direct access to a very broadly based user community. They can also offer a much wider range of products than the publisher or even other intermediaries (booksellers, subscription agents, database hosts) as they are not motivated primarily by financial incentives, although they may need to limit the range of resources available because of financial constraints. In the case of public libraries and the majority of academic and educational libraries, this achievement is at the expense largely of the tax-payer throughout the world.

Naturally libraries, as major resources of information, and valuing their unique role to reach so many users, want and need to be able to exploit new possibilities. However, if they are no longer going to rely on a paper-based industry, the alternative will be to use materials in electronic formats of many kinds, all of which are vulnerable to a range of threats including unauthorized copying, redistribution, repackaging and even republishing under different labels. Document suppliers, whether in traditional libraries or in the commercial sector, will certainly need to be able to do some of these things, to meet the changing expectations of their customers.

The changing role of the library in the economic model for publishing is explored further in the chapter on intellectual property rights.

11. Access versus ownership

In the paper world subscribers to scientific journals purchase a physical volume and can do as they like with it (technically called exhaustion of rights). In the electronic model the economics are quite different. There is nothing to "own" in the usual sense. The publisher owns the electronic database in which journal articles are stored and allows access to this either on a pay-per-use basis (in which case the user obtains possession of either a printout of the article or simply the right to look at it onscreen for a limited period) or access on a predetermined level from a given number of access points for a specific geographic area and for a specified

length of time in return for licence fees which may be fixed in advance in accordance with the size of the elements just mentioned. Licences can be highly complex but will usually cover such issues as

- a) Number of access points
- b) Number of parallel uses
- c) Actions allowed – downloading, printing, storing, networking (intranet) re-use
- d) Archival access
- e) Time before licence is renewed or re-negotiated
- f) Access in the event of the licence being terminated

In traditional publishing a) and b) are determined by the number of copies bought; c) is limited to photocopying and may be negotiated or, more likely, carried out under national copyright laws; d) is not an issue as the purchaser has possession of the physical publication; e) is simply a matter of renewing a subscription or not and f) is like d). In an electronic model all of these issues are essential. a) and b) will help determine the price of the licence; c) will be vital as the list of actions (which is not exhaustive) will govern the price but also be important for the subscriber to be able to carry out more sophisticated information provision processes than is possible with paper publishing), d) is a matter of major concern as access to the **total** electronic file is governed by the fact that the institution subscribes at all. Rarely are institutions allowed retrospective access to databases to which they no longer subscribe yet archival material is essential to good scientific research and investigation. e) allows a certain element of stability in providing access and f) is an extension of the archival problem.

12. Licensing agencies

One way in which publishers try to gain some benefit from copying in traditional media is the licensing agency. Agencies for collecting royalties go back a long way. In the UK the Performing Rights Society, which collects royalties for composers whose works are performed live in public, was founded in the 1920s. Many countries now have collecting societies for published books and journal articles. Their methods of operation vary but, generally speaking, they offer a licence to users to copy material in return for fees which may be transaction-linked (i.e., each individual action is recorded and used as the method for distributing the royalties collected) or they may offer a "blanket" licence and use sampling methods to determine how the royalties should be distributed. The former is cost-intensive and requires detailed record keeping but pays owners what they should get; the latter is much cheaper to administer but offers a sort of "rough justice" so that owners get something which approximates to their rightful payments but not exactly and this will vary from one sampling point to another. Agencies exist to cover published books and journals, performances, newspapers and in some countries film rights as well. In the "physical" delivery of information the licensing agency has a vital role to play but in the electronic context owners do not see the benefit of this "middle-man" in the payment chain. As it is now possible to monitor use of electronic material exactly and even arrange online billing and collection of royalties publishers see the licensing agency as irrelevant. Their role in electronic royalty collection has been limited largely to licensing the digitization of existing paper materials rather than being involved in "born digital" materials. The great disadvantage from the user's point of view is that they are required to have separate agreements with many different suppliers whereas licensing agencies make this unnecessary in the same way that periodical subscription agents reduce the number of individual transactions that libraries need to perform. Whether or not the licensing agencies will be able to transform themselves into Trusted Third Parties (TTPs) which collect money on behalf of a range of owners from many different users is still open to question.

12.1. International Coalition of Library Consortia

The ICOLC have issued various guidelines to try to establish "ground rules" for publishers and libraries in acquiring and making available electronic journals under licence. They say, for example: that publishers price most e-journal content using the cost of the print publications as their base price (the "print-plus" model), but in many offers from publishers, the pricing of the electronic journal is expressed as an "add-on" to the price of the print product, or alternatively the price quoted is linked to a "no-print cancellation" clause in the contract. A few publishers now offer an "electronic-plus" model, with the electronic journal being supplied for a base price and a price for print copies being added to that base price. This model is acceptable,

provided that the purchase of the print copies is optional, *and* the base price for the electronic content is no more than a reasonable percentage (say 80%) of the price for the electronic-plus-print (thereby reflecting the savings that the non-supply of print copies can bring), *and* the combined electronic and print price is no more than current print-only prices (thereby reducing the risk of additional cancellations to pay for both formats).

ICOLC also emphasizes that their members wish to receive from publishers offers that are not necessarily based upon the traditional title-by-title subscription model. Some publishers have already broken away from that model and offer their total content for the price that a library might have paid for a limited number of print journal subscriptions. This "all-you-can-eat" model does meet the needs of many - although not all - libraries and consortia. However, to meet the diverse needs of different consortia and libraries, "all-you-can-eat" should be one of the options offered by a publisher. The wider the number of choices, the greater the chance of satisfying the customer. It is hoped that publishers will be encouraged to offer additional pricing options that provide increased value for money in certain situations, such as "pay-as-you-use" options by which the consortium or library may purchase blocks of journal articles, or may pay only for delivery of the articles that are actually used, or "Total title purchase" for selected groups or subject clusters of titles, with "pay-as-you-use" available for the titles not selected.

One major concern to libraries and institutions generally is the "no-print cancellation" clauses in licenses and contracts for e-journals, and to pricing models that impose financial limitations or penalties when cancellations are permitted. It is an increasing view that publishers should direct more effort toward new pricing models that break away from print-based models, as explained in this document.

Publishers see the electronic world as one in which they can, for the first time in many cases, actually determine what is used and by whom. This is valuable marketing information but it raises two important issues.

Firstly, confidentiality. Use by individuals of scientific material could reveal all kinds of personal data apart from straightforward marketing information. Reading patterns could be used to reveal political or philosophical interests, sexual orientation or health data. Secondly, the use of scientific literature by a research institution or company will give clues as to its commercial programme and exploitation.

Most subscribers to scientific journals are interested in working with publishers to develop purchasing models that meet the diverse needs of educational organizations in different countries. For example, the traditional print-based subscription model may become less satisfactory for meeting the educational needs of North American and Western European institutions. Innovative partnerships between educational authorities and publishers may be needed to produce a better service to users in countries in all parts of the world.

It is also encouraging to note recent initiatives from some publishers who provide electronic journals for free or at very affordable access to countries in transition, such as the programs to provide health-related information through the World Health Organization, and the science and technology publisher responses to the Open Society Institute Electronic Information for Libraries (eIFL) program. Publishers are encouraged to also address the needs of more developed nations that may be experiencing extremely weak national currencies. These issues are discussed in more detail on the ICOLC website at <http://www.library.yale.edu/consortia/>

13. Third World situation

If the problem of "who pays" is of concern to those working in relatively developed economies, how much more worrying is it for those in economic situations which are seriously under-developed or still trying to develop to higher standards. The issues raised are enormous for such countries. Capital is limited and budgets for research and scientific development are easily reduced in the light of any economic changes. In addition, there are often basic issues of currency exchange and lack of availability of "hard" currencies with which to pay for access and the more mundane but crucial problems of whether the technology is available to access the material in the first place and, if it is, does it work. A number of initiatives in this area are trying to

find economic models which will allow Third World countries to have access at much reduced costs. Mention has already been made of IAIA and its founding document states

Information is a basis for knowledge, and equitable access to information needed for human development is a basic human right in all branches of education, science and culture. All members of the Alliance commit themselves to enabling access to essential information that is appropriate, affordable, of guaranteed validity and quality, and in formats that respond to the needs of the intended audiences. Such information and knowledge can originate from any country of the world and be in any language.

Open Access initiatives have arisen in a number of sectors. These have the common objective of working to allow users, particularly those in developing countries, to obtain information products that would otherwise be unaffordable, and therefore inaccessible. These initiatives operate in an information environment that includes 1) sources of information (publishers, authors and other rightsholders), 2) information transfer media (the whole gamut of online and offline options), 3) rules for information transfer (technical, economic, legal and normative rules), and 4) users of information (whether infomediaries such as libraries, documentation centres, and teaching establishments, or individuals), who may themselves also be sources of information. Open Access initiatives typically include provision for a two-way flow of information.

Such initiatives include INASP (International Network for the Availability of Scientific Publications), The Essential Electronic Agricultural Library (TEEAL) and International Programs of American Association for the Advancement of Science. More information on TEEAL can be found on their website at <http://teeal.cornell.edu>

Some publishers are now aware that the economics of information supply to developing countries cannot meet the needs of those countries nor can they provide the publisher with a sustainable return on investment. Initiatives by major scientific publishers in the health field, such as Academic and Elsevier, have resulted in much reduced subscriptions for developing countries. This programme has been organised in conjunction with the World Health Organization (WHO).

14. Specific examples of licences and models

Emerald Press (formerly MCB University Press) have taken the initiative for a number of years by providing subscriptions which, although high by most publisher standards, include all kinds of additional benefits to the purchaser. In Emerald's own words:

The pressure on libraries to provide more information with less budget is growing. Academic librarian professionals need to find ways to satisfy the research needs of increasing numbers of faculty and students; while managing new technology, increasing workloads and decreasing staff numbers. Library consortia networks have existed for a long time, particularly in the USA, but their main aim of sharing printed material, has changed to providing common access to electronic resources via the Internet. Emerald has developed a consortia model that provides a win-win solution for both publisher and library."

Emerald Consortia initiatives provide:

- Lower cost information
- Access to considerably more journals and information
- Price predictability and budget stability for fixed terms
- Purchasing options to suit everyone
- Preferential pricing and discount for additional paper and electronic resources
- Flexible licensing models
- Library resource facilities and training
- Archiving solutions.

By buying into the Emerald package any subscriber can obtain all or any of these benefits. Naturally the pricing reflects the range of possibilities but it goes a long way to achieving what has been said earlier in this paper – that libraries and institutions need flexibility to be able to deliver services the publisher cannot or is unwilling to do because of the economics of the service.

JSTOR is a not-for-profit organization in the U.S. dedicated to long-term preservation of and access to scholarly publications. And more information about its activities can be found at <http://uk.jstor.org/about/need.html> JSTOR Arts & Sciences I Collection includes non-current issues of 117 important research journals. Journals are digitized back to the first issue published (many of which date from the 19th century) and continue to a date no more recent than 3-5 years prior to the most current published issue. The licence sets out both permitted uses and prohibitions and is quite generous in its scope. Fees for the licence are determined on a banded scale according to the size and nature of the institution. For example the licence sets out Permitted Uses which puts into context what JSTOR's objectives are. The collections are provided for educational purposes only. Publication, redistribution to persons other than Authorized Users and all commercial use is expressly prohibited. Products, unless there is a clear statement to the contrary, are licensed for use only by faculty, staff, students, and "walk-in" users of the licensed institution. The agreement permits use by specific categories of users only. In the case of JSTOR these are detailed as

- a) Students, Faculty and Staff regardless of location
- b) Remote Access within the country concerned
- c) Remote Access Overseas
- d) Student Placement in Industry
- e) Walk-in-Users
- f) Honorary Members of Staff.

At the same time the agreement prohibits use of various categories as well, for example:

- a) People from Industry on Courses Run by their Employer
- b) Retired Members of Staff
- c) Alumni.

Having set out WHO can use the service the licence then details what they may or may not do. Authorized Users may, within the scope of the JSTOR User Rules:

- a) Access and use JSTOR Collections for classroom instruction and related activities including handouts, presentations, research, and student assignments.
- b) Use JSTOR Collections as part of a professional presentation at a conference, seminar, workshop, or other professional activity or in a public display or performance in the (Institution name) gallery or similar facility.
- c) Use JSTOR Collections for student or faculty portfolios, term papers, theses, and dissertations, provided copies of these are not published or redistributed.

The licence further indicates that authorized Users may not:

- a) Use JSTOR Collections for any purposes other than education, research, or scholarship.
- b) Use JSTOR Collections for any commercial or business-related purpose whatsoever.
- c) Reproduce, distribute, redistribute, or publish JSTOR Collections outside of your institution without obtaining permission.
- d) Download from the JSTOR archive an entire issue of a journal, significant portions of the entire run of a journal, or a significant number of sequential articles unless prior written permission has been obtained from JSTOR.

These are detailed but quite reasonable and enable the user to know whether or not they are allowed to use the system and, if so, what they are permitted to do. In return for this JSTOR charges a fee and subsequent individual uses of the material are of no interest provided they are within the rules.

15. Alternative models

Many attempts are being made to produce alternative models and alternative publications. For example the services offered by BioMed Central. As it states on their website www.biomedcentral.com which says that I/we retain copyright.

I/we grant to any third party, in advance and in perpetuity, the right to use, reproduce or disseminate the article, in any format or medium, in whole or in part, provided that the integrity of the article is guaranteed and not compromised in any way, that BioMed Central is duly identified as the original publisher, and that proper attribution of authorship and correct citation details are endorsed on the article or its parts.

I/we grant to BioMed Central (its successor and assigns) an irrevocable world-wide licence for the full term of copyright in the article to publish it and identify itself as the original publisher.

This respects the rights of the original creator but, at the same time, releases the material to be used by BioMed. Those rather "ethereal" moral rights (paternity and integrity) become firmly fixed in a contract for publishing in an electronic context. This increasing emphasis on moral rights is crucial in this search for alternative models as the search so often focuses on the needs of the individual not the institution or the publisher. Therefore to focus on individuals for their needs but not their rights would be bizarre.

16. Scholarly publishing models

SPARC (the Scholarly Publishing and Academic Resources Coalition) has launched *Gaining Independence: A Manual for Planning the Launch of a Nonprofit Electronic Publishing Venture*. This is a detailed, step-by-step guide leading readers through the creation of a business plan for start-up and early-stage electronic publishing ventures, including digital repositories and journals. *Gaining Independence* will help universities, libraries, societies and others conceive, plan and implement alternatives to commercially published scholarly and scientific information. It provides background on relevant electronic publishing models and focuses especially on areas of business planning that may be unfamiliar to those considering new communication initiatives. The manual includes sections on: Situational Assessment and Strategic Response; Technology and Technical Considerations; Markets, Marketing and Sales; Organization; Finances; and the Financial Plan and Operating Plan.

SPARC was founded as a constructive response to market inequities in the scholarly communication system and is taking steps toward building a system that serves the needs of the scholarly community and facilitates effective partnerships between scholars and their institutions or societies. Our aim for *Gaining Independence* is to help make alternative scholarly initiatives mainstream and self-sustaining by emphasizing the application of sound business planning practices.

17. Conclusion

The economics of publishing are in a state of flux. Publishers, authors, libraries and users are all unclear about their new roles in a business which is being changed out of all recognition by the advent of the worldwide web and other electronic methods of communication. Authors need to decide what they wish to achieve by being published, publishers must consider how, and if, they can generate profit in this new context; libraries will remain but will not remain the same (Smail 2002). Those funding research and innovation must consider whether they wish to generate income from the innovation itself or also from publishing information about it. Questions abound: will traditional publishing survive? Can commercial publishing continue in science at all? Will online access totally replace the printed word? Who will pay for access in the future? Who will pay for those unable to afford access? This last question has far-reaching implications not just for the Third World but for those strata of society in developed economies where individuals need information but cannot afford to pay for access to it. Nobody knows the answers to these questions and only time will tell what they will be. Everyone involved in information creation, provision or use needs to be aware that they are waiting to be answered.

18. References

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